

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 January 2001 (18.01.2001)

PCT

(10) International Publication Number
WO 01/04320 A1

(51) International Patent Classification?: C12N 15/45,
5/10, 7/00, C07K 14/115, A61K 39/155

(21) International Application Number: PCT/US00/17066

(22) International Filing Date: 16 June 2000 (16.06.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/143,134 9 July 1999 (09.07.1999) US

(71) Applicant (for all designated States except US): THE
GOVERNMENT OF THE UNITED STATES OF
AMERICA, as represented by THE DEPARTMENT
OF HEALTH AND HUMAN SERVICES [US/US];
Suite 325, 6011 Executive Boulevard, Rockville, MD
20852 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SCHMIDT, Alexan-
der, C. [DE/US]; 1831 Belmont Road #203, NW, Wash-
ington, DC 20009 (US). SKIADOPOULOS, Mario, H.
[US/US]; 8303 Aqueduct Road, Potomac, MD 20854 (US).
COLLINS, Peter, L. [US/US]; Apartment #401, 12304
Village Square, Rockville, MD 20852 (US). MURPHY,
Brian, R. [US/US]; 5410 Tuscarawas Road, Bethesda, MD

20816 (US). BAILLY, Jane, E. [CA/CA]; 248 Braebrook
Avenue, Pointe Claire, Québec H9R 1V9 (CA). DURBIN,
Anna, P. [US/US]; 806 Hudson Avenue, Takoma Park, MD
20912 (US).

(74) Agents: KING, Jeffrey, J. et al.; Townsend and Townsend
and Crew LLP, 8th floor, Two Embarcadero Center, San
Francisco, CA 94111-3834 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE,
DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,
LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ,
PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,
TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: ATTENUATED HUMAN-BOVINE CHIMERIC PARAINFLUENZA VIRUS (PIV) VACCINES

(57) Abstract: Chimeric human-bovine parainfluenza viruses (PIVs) are infectious and attenuated in humans and other mammals and useful individually or in combination in vaccine formulations for eliciting an anti-PIV immune response. Also provided are isolated polynucleotide molecules and vectors incorporating a chimeric PIV genome or antigenome which includes a partial or complete human or bovine PIV "background" genome or antigenome combined or integrated with one or more heterologous gene(s) or genome segment(s) of a different PIV. Chimeric human-bovine PIV of the invention include a partial or complete "background" PIV genome or antigenome derived from or patterned after a human or bovine PIV virus combined with one or more heterologous gene(s) or genome segment(s) of a different PIV virus to form the human-bovine chimeric PIV genome or antigenome. In certain aspects of the invention, chimeric PIV incorporate a partial or complete human PIV background genome or antigenome combined with one or more heterologous gene(s) or genome segment(s) from a bovine PIV, whereby the resultant chimeric virus is attenuated by virtue of host-range restriction. In alternate embodiments, human-bovine chimeric PIV incorporate a partial or complete bovine PIV background genome or antigenome combined with one or more heterologous gene(s) or genome segment(s) from a human PIV gene that encode a human PIV immunogenic protein, protein domain or epitope, for example encoded by PIV HN and/or F glycoprotein gene(s) or genome segment(s). Human-bovine chimeric PIV of the invention are also useful as vectors for developing vaccines against other pathogens. A variety of additional mutations and nucleotide modifications are provided within the human-bovine chimeric PIV of the invention to yield desired phenotypic and structural effects.

WO 01/04320 A1